Government of Saskatchewan

Annual Report 1985-86

Saskatchewan Environment

Mission:

To protect and enhance the environment in a manner that promotes the physical, economic and social well-being of the people of Saskatchewan today and in the future.

Legislative Mandate

— The Department of the Environment Act, 1984
— The Environmental Management & Protection Act
— The Air Pollution Control Act
— The Litter Control Act
— The Environmental Assessment Act
— The Ecological Reserves Act
— The Scrap Vehicles Act
— The Water Appeal Board Act
— The Civil Defence Act*

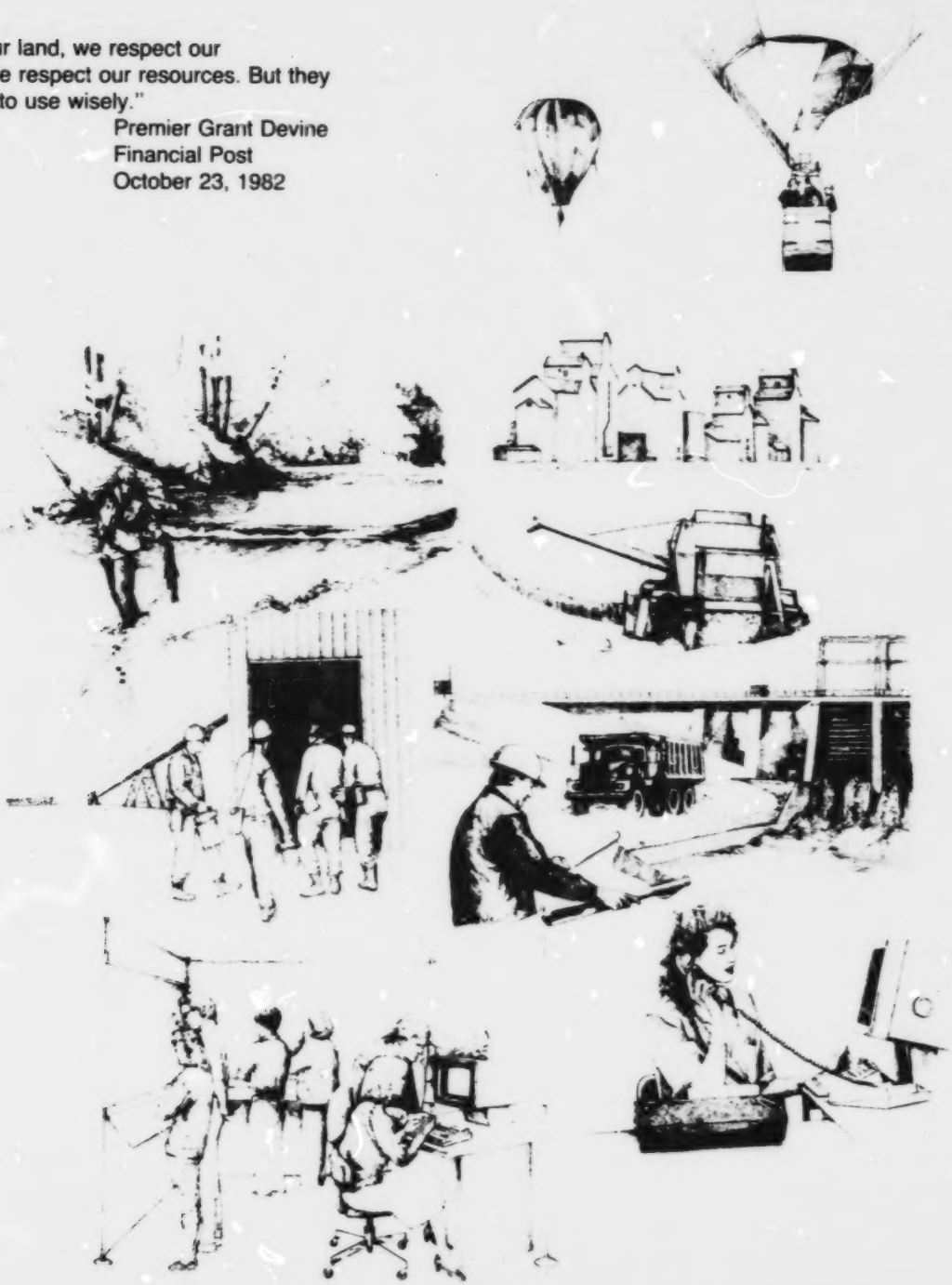
* Responsibility for this legislation was transferred to the Minister of the Environment effective February 13, 1986.

Definition of Environment

1. The Environmental Management & Protection Act & The Department of the Environment Act, 1984
   "environment" means:
   (i) the atmosphere other than the atmosphere in a building or in the underground workings of a mine;
   (ii) surface water or ground water; or
   (iii) soil and subsoil.
2. The Environmental Assessment Act
   "environment" means:
   (i) air, land and water;
   (ii) plant and animal life, including man; and
   (iii) the social, economic, cultural conditions that influence the life of man or a community insofar as they are related to the matters described in subclauses (i) and (ii).

"We respect our land, we respect our environment, we respect our resources. But they have to be put to use wisely."

Premier Grant Devine
Financial Post
October 23, 1982



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H. J. Swan
Minister of the
Environment

His Honour
Frederick W. Johnson
Lieutenant Governor
Province of Saskatchewan
Regina, Saskatchewan

Dear Sir:

I have the honour to transmit the annual report of Saskatchewan Environment for the period commencing April 1, 1985 and ending March 31, 1986.

Respectfully submitted,

Herb. Swan

H. J. Swan

Peter S. van Es
Deputy Minister of the Environment

Honourable H. J. Swan
Minister of the Environment

Dear Sir:

I am pleased to submit the Saskatchewan Environment Annual Report for the year ending March 31, 1986.

It is my belief that the department, over the past year, has contributed significantly to ensuring a continued high quality of environmental protection. This is reflected in the following report.

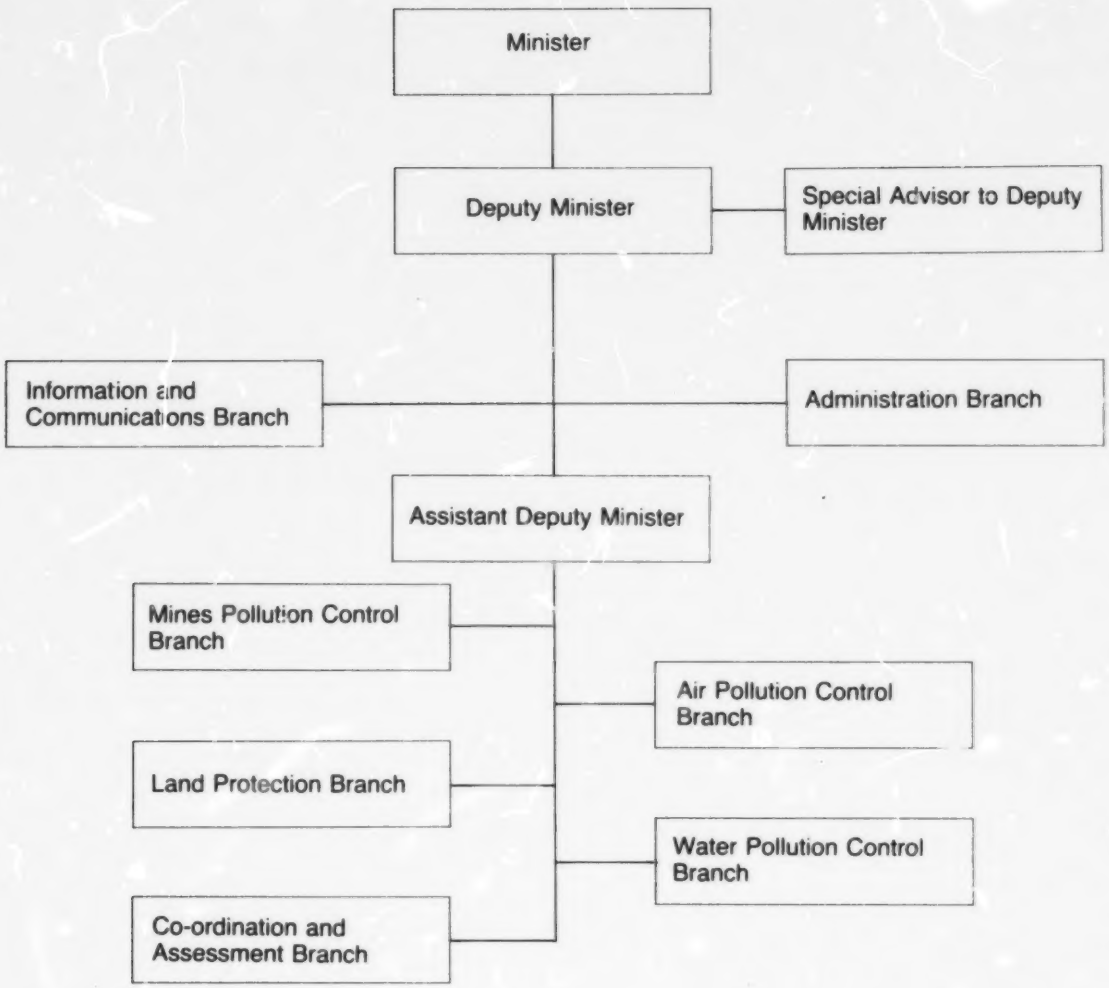
Also significant is the general improvement in the relationship between industry, business and the Department, which is a reflection of the growing realization that sound environmental practice is synonymous with good economic development.

I would like to recognize the hard work and dedication of department staff and also acknowledge the excellent co-operation and assistance of other federal, provincial and municipal government departments.

Respectfully submitted,

Peter S. van Es
Deputy Minister

Organization Chart



Department Operational Overview

G. W. Howard
Assistant Deputy Minister

Environmental Protection

Environmental protection activities are concentrated in five branches reporting directly to the Assistant Deputy Minister:

— Air Pollution Control
— Water Pollution Control
— Land Protection
— Mines Pollution Control, and
— Co-ordination and Assessment.

Environmental Protection Model

Protection and enhancement of Saskatchewan's environment is a complex task and requires the co-operation of the various level of government, industry and the public. Saskatchewan Environment uses the following model to manage its activities:

— establishment of environmental quality objectives;
— establishment of emission standards;
— licensing of the construction and operation of waste treatment works;
— monitoring and inspections;
— requiring improvements where necessary; and
— enforcement of standards and regulations.

The model is complemented by the activities of the Co-ordination and Assessment Branch. This branch assists proponents of new or expanded developments in providing the type of information government requires to make a decision on the feasibility of the project in environmental or socio-economic terms. The degree of information required will depend upon the complexity of the undertaking or its possible impacts.

When the project is authorized to proceed, information is provided by the branch on the regulatory requirements of this and other departments.

Other Agency Contributions

Not all of the Saskatchewan Government's environmental protection activities are contained in Saskatchewan Environment. Some other agencies that make an important contribution in the field of environmental protection are:

Saskatchewan Agriculture — through its program to control wastes from Intensive Livestock Operations and administration of The Pest Control Products Act.

Saskatchewan Energy and Mines — through its program to regulate waste disposal and transportation in the oil and gas fields.

Saskatchewan Health — through its analytical work at the Provincial Laboratory and provision of medical advice.

Saskatchewan Urban Affairs and Saskatchewan Rural Development — through good land use planning advice to local government.

Saskatchewan Water Corporation — through funding of community sewage and water works.

Poplar River Project

The Poplar River Project including the power station, mine and water control works is an example of the need for an integrated approach to environmental concerns. The air and water emissions, waste handling and mining are licensed and monitored by various branches of the department. Monitored data are exchanged with federal and U.S. agencies. Each year a joint report is provided to governments.

The Assistant Deputy Minister is responsible for assembling and disseminating Saskatchewan data and is the Canadian Co-Chairman of the Canada-U.S. Committee that reviews the data and reports on trends and concerns.

In 1985, the two 300 mW units operated all year. No significant impacts were identified by comprehensive monitoring in Saskatchewan and Montana. Emissions did not result in any violation of Saskatchewan, Montana, or United States standards. Water quality objectives for the Poplar River, recommended by the International Joint Commission, were met at all times.

Ecological Reserves

Two branches, the Co-ordination and Assessment Branch and the Land Protection Branch contributed to the establishment of the first Ecological Reserve in Saskatchewan.

In August, 1985, the Hon. Neal Hardy, then Minister of the Environment, announced that a 2.9 square mile area of Crown land straddling the Assiniboine River near the Manitoba border would become an ecological reserve. Reserves can be established for preservation of genetic material, environmental benchmarks, rare or endangered species and unique environments.

At year's end an appropriate regulation under The Ecological Reserves Act was nearing completion.

The Minister of the Environment also established a consultation group from interest groups and interested individuals to advise the department on the development of a program operations plan for the ecological reserves program.

The department was pleased to assist in the organizing of the 1985 conference of the Canadian Council on Ecological Areas held in Saskatoon.

Research and Special Projects

H. S. Maliepoard
Special Advisor to Deputy Minister

Acid Rain Abatement

Provincial governments in central Canada have agreed to reduce acid gas emissions substantially by 1990. Environment Ministers from the western provinces suggested that increased use of low sulphur western coal in Ontario might contribute to achieving their goal. A federal/provincial task force was established to investigate the feasibility of several scenarios whereby Ontario Hydro might use western coal to help reduce acid emissions from its coal-fired power generating stations.

The task force's investigation considers all facets of the coal cycle including mining and treatment in western Canada, transport to the Lakehead, handling at Lakehead terminals, transport by ship from there to Ontario, mixing and blending in Ontario, and combustion aspects of burning at Ontario Hydro's thermal power stations.

Saskatchewan Environment participates on the task force and co-ordinates activities for the province. The final report of the task force is scheduled for the summer of 1986.

Toxicology Research Centre

The Toxicology Research Centre, established in 1983, is a joint venture between the University of Saskatchewan and the provincial government. Saskatchewan Environment is the funding agency on behalf of the government and functions as the Vice-Chairman on the Board of Directors.

Demands on the services of the Centre have rapidly increased this year. A task force was established to outline the goals and scope of the Centre's activities in order to cope with the increased demands.

The Toxicology Research Centre received a significant boost when the Secretary of State made two million dollars available to renovate space in the Saskatchewan Research Council building on the University of Saskatchewan campus. Construction is underway and completion is expected in early 1987.

Canadian Council of Resource and Environment Ministers

The Canadian Council of Resource and Environment Ministers (CCREM) has a dynamic program which addresses renewable resources and environmental issues which are common across the country.

The Saskatchewan Environment Minister is the senior member for Saskatchewan on the council. Several department staff members participate in a variety of programs as requested by the ministers.

A new program was initiated to find solutions related to the storage, transportation and finally, the destruction of PCBs. A program to provide the public with much needed information on this subject was also designed.

Activities related to drinking water supplies and progress on the development of surface and ground water quality guidelines were a high priority. Other initiatives dealt with hazardous waste management, federal/provincial co-ordination on certain environmental matters as well as efforts to harmonize environmental regulations and programs across the nation.

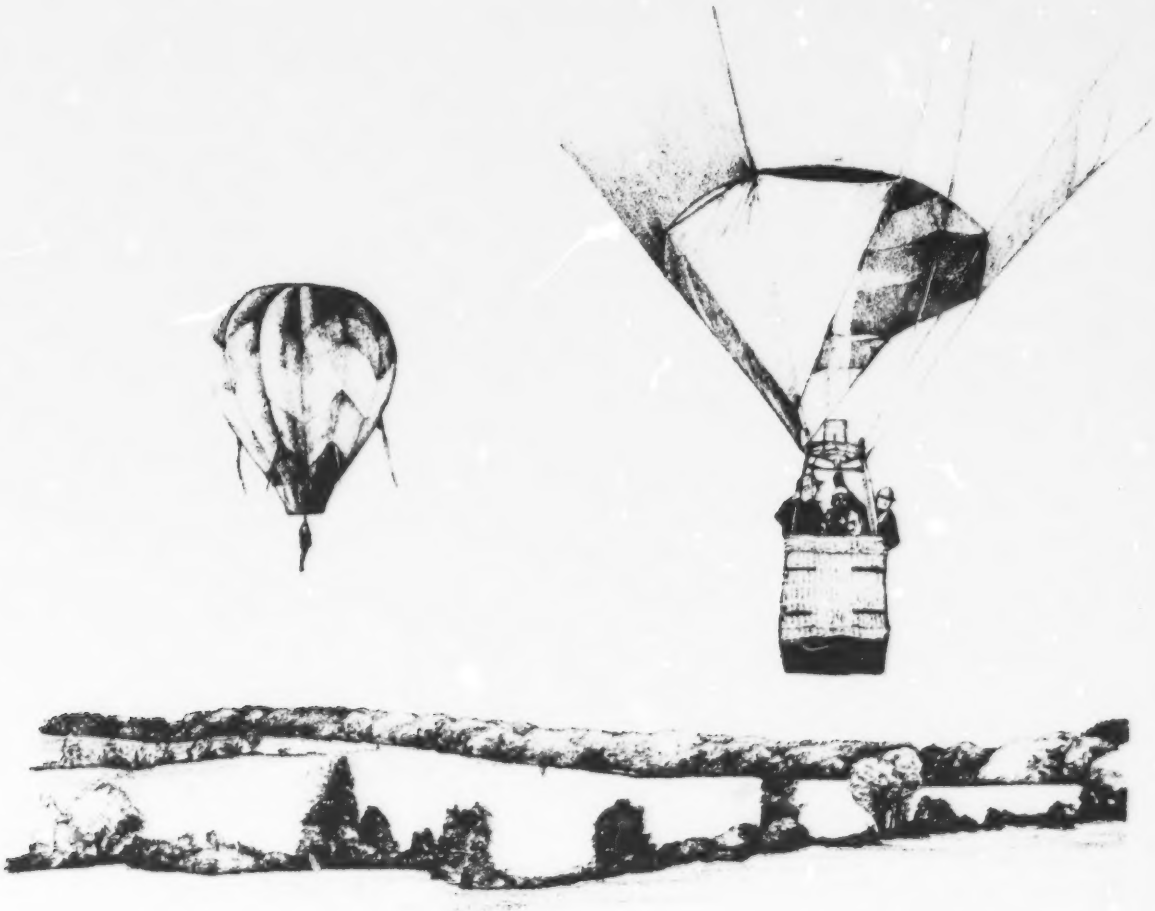
Chemicals and the Environment

Several events and initiatives in Saskatchewan, as well as beyond our boundaries, necessitated increased efforts in dealing with the management of chemicals and their potential environmental implications. The grasshopper control program, blackfly control in northern Saskatchewan and the potential of using aerial herbicides in the forestry industry were issues which not only needed attention but also considerable co-ordination between interested and involved agencies.

Saskatchewan Environment also assumed co-ordination and liaison functions on other chemical related issues originated from the Pest Management Advisory Board of Agriculture Canada and the Federal/Provincial Advisory Committee on Environmental and Occupational Health.

Air Pollution Control Branch

L. J. Lechner
Director



Objectives

— To protect and enhance the overall air quality in Saskatchewan.
— To prevent and/or control air pollution from man's activities.

Activities

— Establish standards/objectives for air quality that are consistent with current knowledge of health and environmental effects.
— Establish emission, operating and location standards/guidelines for industry.
— Regularly monitor air quality in urban areas and carry out special investigations where necessary.
— Investigate complaints and work with industry to reduce emission of air pollutants to the lowest level practicable. Ensure the safety of the public and the compatibility of industry with the surrounding environment. Issue approvals to operate for industrial sources, fuel-burning equipment and incinerators.
— Assess the impacts of air pollutants.
— Work with and through other governments to ensure the transboundary movement of air pollutants does not harm the environment or public health in neighbouring provinces, states or Saskatchewan.
— Keep the public, government agencies and industry informed of air pollution issues.

Air Management

Urban Air Monitoring Program

The provincial Urban Air Monitoring Program operated in ten locations during the fiscal year. Table I outlines the monitoring equipment which was in operation. Monitoring in Yorkton, Weyburn, Melfort, Esterhazy and Melville was carried out as part of a National Health and Welfare study into the respiratory health of Saskatchewan school children. Air quality indices which summarize annual monitoring data were calculated for Regina and Saskatoon. Individual subindices were determined for each of the major pollutants and were averaged to give an annual overall index.

The 1985 values for Regina and Saskatoon were 33 and 20 respectively, which means that overall air quality in the downtown area of Regina can be described as fair and in Saskatoon as good. The 1985 results are comparable to those obtained in previous years. Figure I provides a summary of Air Quality indices obtained over the past 6 years. Suspended particulate matter continues to make the largest contribution to the index in both cities. Dust from roads, soil erosion and farming operations is believed to be a major contributor to the readings that were obtained.

Increased emphasis will be placed on respirable or inhalable particulate matter in the future. The smaller size fractions have more human health significance and monitoring as well as ambient standards will change as a result.

Reports summarizing results from the provincial air monitoring program are available from the department on request.

In addition to the urban air monitoring program, the branch monitored air quality in the vicinity of various industrial operations. A number of operations were required to carry out air monitoring as conditions of approval.

Figure 1

Air Quality Indicies 1981 - 1985

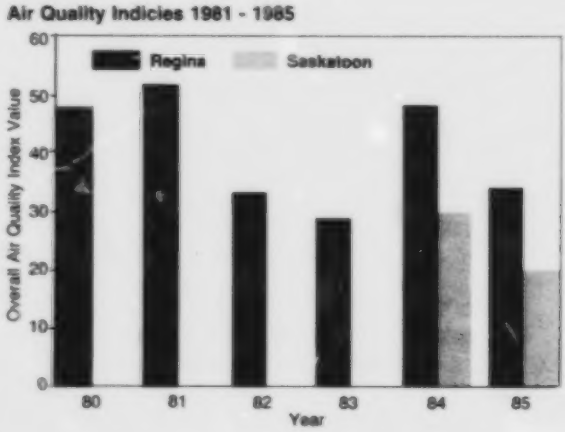


Table 1

Urban Air Monitoring Equipment in Saskatchewan Cities

	Present	Proposed
Regina	2 high volume samplers 1 inhalable particulate sampler 1 sulphur dioxide monitor 1 carbon monoxide monitor 1 oxides of nitrogen monitor 1 ozone monitor	1 wind speed/ direction monitor 1 hydrocarbon monitor
Saskatoon	2 high volume samplers 1 sulphur dioxide monitor 1 carbon monoxide monitor 1 oxides of nitrogen monitor* 1 ozone monitor	1 wind speed/ direction monitor 1 inhalable particulate monitor
Yorkton	1 high volume sampler 2 inhalable particulate samplers 1 sulphur dioxide monitor* 1 carbon monoxide monitor* 1 oxides of nitrogen monitor* 1 ozone monitor*	
Lloydminster	1 high volume sampler 1 sulphur dioxide monitor	1 wind speed/ direction monitor
Estevan	1 high volume sampler 1 sulphur dioxide monitor	1 wind speed/ direction monitor
Weyburn	1 inhalable particulate sampler	
Melfort	1 inhalable particulate sampler	
Esterhazy	1 inhalable particulate sampler	
Melville	1 inhalable particulate sampler	
Moose Jaw	1 high volume sampler	

*Provincial Monitors (other monitors supplied by Environment Canada or National Health and Welfare.

Permit System

The Air Pollution Control Regulations, which came into effect in 1975, outline the provincial air quality standards and the requirements for an industrial permit system. New industrial sources of air pollution require permits from the Branch. Existing operations do not require permits unless requested by the Minister of the Environment or unless a significant expansion program is undertaken.

During the fiscal year, 22 new permits were issued and 104 permits were renewed. Figure 2 illustrates the growth in the number of permits issued since 1975.

Figure 2

Industrial Permits Issued 1975 - 1985

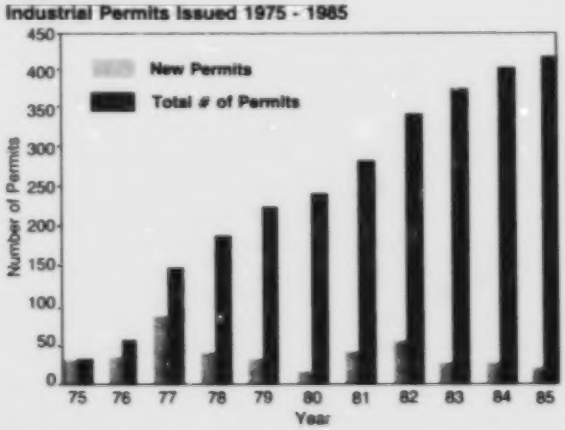


Table 2
Classification of Permits

	New	Renewals	Cancelled
Anhydrous Ammonia Storage Facilities*	—	—	11
Asphalt Plants	6	34	2
Bulk Anhydrous Ammonia Facilities	—	1	—
Grain Elevators	—	21	—
Gas and Oil Gathering and Treating Facilities	5	13	1
Agricultural Chemical Formulating Plants	1	—	—
Incinerators	2	5	1
Iron Foundries	—	1	1
Steel Mills	—	1	—
Seed Cleaning and Treating Plants	—	7	—
Chlorine Packaging Facility	1	—	—
Concrete Batching Plants	1	3	—
Crematoriums	2	2	—
Miscellaneous Industries	4	16	7
Total	22	104	23

*Regulation of these facilities transferred to the Department of Labour.

Industrial Monitoring Activities

Federated Co-operatives Limited, Regina

A sulphur recovery plant was put into operation by the refinery in the fall of 1984. Since that time ambient sulphur dioxide levels as measured by the company's monitors have decreased substantially. On the other hand, hydrogen sulphide levels increased in 1985 and the sulphur storage area has been implicated as the most probable source.

The odour problems previously experienced have not been rectified and an odour survey/ investigation is pending.

The branch reviewed the NewGrade Energy environmental impact statement and provided input to the department's technical comments. The level of control of sulphur emissions proposed for the upgrader should be adequate to prevent violations of air quality standards during normal process operation. During upset conditions, however, short-term excursions of standards can be expected. The impact of the upgrader on the odour situation cannot be predicted with certainty.

IPSCO Inc., Regina

A new baghouse dust control system for furnace No. 5 was installed during the year. Performance tests indicated that the unit was operating satisfactorily.

Poplar River Power Station, Coronach

The Saskatchewan Power Corporation and the branch conducted ambient air monitoring for sulphur dioxide and suspended particulate matter. Monitoring results showed the plant had a small impact on the levels of these pollutants in the area. Air monitoring data is exchanged with U. S. authorities.

Armak Chemicals, Saskatoon

An odour control incinerator was placed into operation early in the fiscal year. One odour complaint was received, indicating that the incinerator is at least partially effective in controlling odours. At year end, an extensive performance test of the incinerator was being planned.

Complaint Investigation

Seventy-two air pollution complaints were received by the branch. This represents an increase of approximately 64% from the previous fiscal year. In general, the complaints centered on odours and dust from operations such as refineries, unpaved roads and grain elevators. In a number of cases, small changes to operating procedures were or would be sufficient to satisfy the complaint. On the whole, Saskatchewan industries and citizens co-operated with branch requests to eliminate the causes of air pollution complaints. Of the 72 complaints, 18 were resolved during the year, 16 were still under investigation at the end of the reporting period and 7 required further action by industry to correct the problem.

Special Studies

Urban Air Monitoring

During the year, a major monitoring program was initiated by National Health and Welfare. The purpose of the program is to measure levels of selected air pollutants at several Saskatchewan locations and to relate these levels to the respiratory health of school children in the area. The branch participated in this study by installing and operating monitoring equipment in Yorkton, Weyburn, Melville, Melfort and Esterhazy.

The study is an important opportunity for the branch to gather data on pollutant levels in some of the smaller centers and to gain experience on additional types of equipment. On an international level, this study is one of the few which will attempt to relate levels of acid causing air pollutants to overall respiratory health and the incidence of respiratory illness. The monitoring effort will be extended into next fiscal year, providing sufficient funding is available.

Acid Rain

Saskatchewan Environment is a member of the Western Canada Long Range Transport of Atmospheric Pollutants Technical Committee. The committee plans and co-ordinates acid deposition research and monitoring programs for western Canada. An annual report outlining the acid rain activities in western Canada during 1985 is available from the department on request.

A rainfall sampling program in northern Saskatchewan was continued in 1985. Samples of rain events were collected and analyzed from six sites. The levels of sulphate and nitrate (indicators of acid deposition) in the rain were quite low. Further monitoring will be carried out in 1986.

A long-term lake sampling program, initiated in northern Saskatchewan in 1984 in co-operation with Environment Canada was continued in 1985. Twenty-two lakes were each monitored once during the summer months.

Preliminary maps of Saskatchewan depicting soils and geology sensitivity to acid precipitation were completed in March, 1983. Discussions have been held with Manitoba and Alberta to ensure continuity at the borders before the maps are finalized. A similar project is under way to produce lake sensitivity maps for the province. It is expected these maps will be completed in the next fiscal year.

Saskatchewan Environment is participating with the other western provinces in a study to develop acid deposition criteria for western and northern Canada to protect highly sensitive ecosystems. It is apparent that the criteria of 20 kg/ha/yr of wet sulphate used in eastern Canada may not be appropriate for western and northern Canada. The relative importance of dry deposition and total acid loading criteria are of concern. This study is anticipated to be completed in the next fiscal year.

Legislation

Air Pollution Control Act and Regulations

A review of The Air Pollution Control Act and Regulations has been completed and a number of areas requiring updating and modification were identified. Additional ambient air quality standards will be included in the new Regulations and changes will be made to the permit system to bring major existing industries under the approval process. A revised Air Pollution Control Act will be introduced to the Legislature in the near future.

Water Pollution Control Branch

D. A. Fast
Director

Objectives

— To protect and enhance the long-term quality of Saskatchewan water resources;
— To prevent and abate water pollution from point sources such as industrial and municipal operations and from diffuse, non-point sources.

Activities

— Establish water quality objectives and standards for surface water and ground water;
— Establish design criteria, set standards, and review applications for the construction of industrial effluent works, drinking water works, sewage works and storm sewer works;
— Establish guidelines and standards for the operation of drinking water works, industrial effluent works, and sewage works; set site specific limits and monitoring requirements for these works;
— Provide technical assistance and operator training to communities in identifying process problems, correcting emergency operational problems, and in having qualified operators at drinking water and sewage works;
— Collect and interpret surface water quality, ground water quality and related data; process and store the data;
— Inspect, conduct tests, collect samples, investigate and gather information or require the client to do these things for industrial effluent works, drinking water works and sewage works;
— Investigate complaints, provide data and expert comment on water quality, pollution control, and drinking water treatment to the public and any private, public or government agency;
— Consult with and maintain close touch with agencies such as the Saskatchewan Water Corporation and the Prairie Provinces Water Board (PPWB) on matters that relate to water quality;
— Regulate the application of chemicals used in or near surface water for the control of aquatic nuisances;
— Administer a certification program for operators of municipal drinking water and sewage works;
— Identify research requirements on water quality, water pollution, water treatment; consult with and provide comments to other agencies on their water research program;
— Work with and through other governments to ensure transboundary water contaminants do not harm the environment or health in neighboring provinces, states or in Saskatchewan.

Objectives, Standards and Approvals Section

Drinking Water and Sewage Approvals

During the fiscal year 343 construction approvals, 91 Minister's Orders and 108 permits were issued by the Branch for municipal, private and government works. Construction costs for the facilities were approximately $42 million. At year end, there were 509 and 493 municipal drinking water and sewage systems respectively. Permits are issued for existing sewage works and conditions are included on monitoring, discharge limits, reporting to the Department, and on other measures required at a particular site to ensure the protection of the environment and public health. Minister's Orders are issued for existing drinking water works.

Industrial Approvals and Inspections

During the fiscal year, 2 construction permits, 1 Minister's Order and 13 permits were issued. Site inspections and several meetings were conducted regarding these facilities.

Biocide Regulation

The Branch issued 82 permits for the application of biocides to public surface water primarily for control of algae and other plant growth. In addition, 31 permits were given for use of 15 other types of chemicals or mixtures for special applications.

Surface Water Quality Monitoring

Water quality trends of Saskatchewan surface waters were regularly monitored. During the fiscal year approximately 17,000 samples were collected by the Branch or by others on behalf of the Department. Approximately 74,000 analyses were performed. A summary of sampling locations is shown in Table 3.

Table 3
Water Quality Sampling Statistics

		Total Samples	Total Analysis
Surface Water (Basin)	Qu'Appelle	106	2544
	N. Sask. River	48	1392
	S. Sask. River	104	2600
	Sask. River	32	1280
	Souris River	8	312
	Missouri River	9	432
	Northern Contract	14	560
	Other	51	510
Municipal	Water Chemical	568	3976
	Water-Bacteria	11419	11419
	Sewage	24	336
	Free Analysis (water, sewage and receiving water)	711	11376
Industrial (Sub by Company)	PAPCO, P.A.	396	5940
	Saskatoon Chemical	442	3094
	Armak	352	1408
	CSP Foods	358	1790
	SPC-Boundary	105	630
	SPC-Poplar	972	7776
	SPC-Queen Elizabeth	21	462
	Other Industries	351	1404
	Receiving Stream	300	4079
Industrial (Sask. Environment)	PAPCO, P.A.	17	408
	Saskatoon Chemical	13	325
	Armak	11	297
	CSP Foods	3	78
	SPC-Boundary	12	552
	SPC-Poplar	6	300
	SPC-Queen Elizabeth	6	90
	Other	37	592
Special Studies	Sask. River	153	5508
	M.J. Hg Control Proj.	27	189
	Spring Runoff	53	848
	Complaints	39	312
	Plankton	6	6
	Quality Control	32	800
	Misc. (Inc. spills)	49	686
	TOTAL	16855	74311

Data Management

The Branch has 3 computer systems that are operated through SaskComp. These systems are ESQUADAT, BIODAT, and WINDAT. The ESQUADAT system is used for handling chemical and bacteriological data for surface water, drinking water and wastewater. The BIODAT system handles biological data including algae information. Information on municipal water and sewage works and on the plant operators is on the WINDAT system. These computer systems organize, sort the information, as well as assist in completing various graphs, calculations and statistics.

During the year a micro computer was purchased to compliment the above mainframe systems. The micro is used to handle municipal bacteriological data, to transfer data from clients and laboratories via telephone and to keep track of various licensing activities.

Monitoring, Inspections and Technical Assistance Section

Ten regions have been established in the province. Staff in the regions carry out inspections and sampling at industrial effluent works, municipal water and sewage works and at surface water stations. Eight of these regions, including the Regina Head Office are now in operation.

Municipal Inspections

A total of 982 visits to municipalities were made by Branch staff to inspect water and sewage works and to provide technical operating assistance.

Free Analysis Program

This program is intended to assist communities in monitoring municipal drinking water quality, wastewater quality and the quality of waterbodies receiving treated sewage. The program has been expanded to assist with the cost of analysis for the required chemical tests on drinking water, receiving waters and on effluent. During the year 56% of the municipalities participated in the program.

Operator Training

The Operator Training and Certification Committee is comprised of three operators from various areas of the province and two Branch staff.

At the end of the fiscal year, there were 222 certified operators for water and sewage works under the voluntary Operator Certification Program. Eighteen training sessions for plant operators were held during the year throughout the province, with a total attendance of over 300.

The Branch administered the following correspondence courses: Western Canada Water and Sewage course, California State University courses, Treatment Plant Supervision course, and Maintenance Management Correspondence course for operators of municipal water and sewage works.

Interagency Activities

Branch personnel participated on 21 different committees/boards. These range from the National Drinking Water Quality Group and the CCREM Water Quality Task Force to Advisory Boards at Kelsey Institute. Comments on some of the interagency activities are noted below:

Mercury in Saskatchewan Fish

Branch staff chaired an Interagency Mercury in Fish Committee, which reviews the results of mercury in fish in provincial waterbodies and makes recommendations to the public concerning fish consumption limits.

Prairie Provinces Water Board

A Branch representative participated on a committee which is developing site specific water quality indicators for major streams at the inter-provincial boundaries.

Saskatchewan Water Corporation

The Water Corporation Act requires the Department's review and approval of construction applications for water and sewage works prior to the issuance of a construction license by the Saskatchewan Water Corporation.

National Water Quality Guidelines

Staff participated on a National Water Quality Task Force. The task force is reviewing existing water quality guidelines and will make recommendations to the Canadian Council of Resource and Environment Ministers (CCREM) concerning national surface water quality guide lines. The task force is also preparing a report on water research needs.

Infrared Lagoon Project

A Saskatchewan Water Corporation/ Saskatchewan Environment cost-shared project was conducted to provide information on municipal sewage lagoon conditions.

Aerial photography using infrared film was the technique used.

Complaints and Information Requests

A total of 49 complaints were handled by the Regina office during the year. They were categorized as follows: 21 sewage/lagoon complaints, 11 drinking water problems, 6 biocide concerns and 11 complaints on other water related matters.

Information and data requests from consultants, government agencies and private individuals are received. A total of 102 information requests and 83 data requests were handled.

Telephone inquiries from communities and private individuals were received by the Branch's Regional Environment Officers. Approximately 1,200 calls were handled in the 1985-86 fiscal year.

Projects

Lake Diefenbaker

Field monitoring for the Lake Diefenbaker/Upper South Saskatchewan River Water Quality Study was completed in June, 1985. The one-year field investigation, a joint effort with Environment Canada, involved a total of fourteen sampling trips to the lake and river.

A review of the study results has been initiated and it is expected to provide additional information on the present water quality of Lake Diefenbaker and identify stresses on the aquatic ecosystem. In March, 1986, the Water Pollution Control Branch contracted Dr. Walter Rast from the United States Geological Survey to assist in the data review and evaluation especially relating to the trophic status of the lake.

Lovering Lake

A summary report on the water quality of Lovering Lake has been completed. The report describes the results of a one year study of the lake, performed to follow-up on public concern over a perceived deterioration in water quality.

Kenosee Lake

The final report on the one year intensive water quality study conducted by the Water Pollution Control Branch was printed and distributed.

The study indicated that Kenosee Lake falls within the eutrophic category. The lake was shown to be bacteriologically satisfactory for contact recreational uses.

Wakaw Lake Study

During the 1985-86 fiscal year a report was completed on the Wakaw Lake - Water Quality Study. The report will be printed and distributed in 1986. The study indicated that Wakaw Lake falls within the eutrophic (very productive) category. Overall evaluation of chemical and bacteriological parameters indicates that the water quality of Wakaw Lake is satisfactory for contact recreation and for the protection of aquatic life.

Saskatchewan River Study

Water quality surveys were initiated on Codette Reservoir and on the Saskatchewan River near Nipawin. Intensive water quality surveys have been scheduled for the reservoir and downstream reaches for the summer of 1986. The main objectives of the study are to provide additional baseline water quality information, and to assess existing and potential water quality concerns related to wastewater discharges. Environment Canada, Saskatchewan Parks and Renewable Resources, Saskatchewan Power Corporation as well as local municipal and industrial clients are participating in the study. An interim report

concerning the findings of the one-year study is to be prepared in 1987.

Moose Jaw Mercury Containment

Monitoring at the Moose Jaw Mercury Control Project was done in the spring and summer of 1985. This monitoring included water and sediment quality sampling at Thunder Creek, Moose Jaw River and Plaxton's Lake, as well as piezometer monitoring on the actual site.

Grasshopper/Wheat Midge Spraying

The Water Pollution Control Branch, in co-operation with Environment Canada, completed a study of the fate of insecticide residues used to control grasshoppers and wheat midge in Saskatchewan surface waters. Water samples were collected from 13 sites and analyzed for five control chemicals. Only one insecticide (dimethoate) was detected at trace levels at 2 locations on the Wood River. A final report on the study was printed and distributed. Further work is planned for 1986.

Guides to Waterworks and Sewage Works Design

The Branch recently completed and published new Guides for Waterworks and Sewage Works Design. These booklets replace the Waterworks and Sewage Works Design Criteria which were last prepared in 1968. The new design guides are more comprehensive and up-to-date, and have been prepared to assist consultants, municipal engineers, facility owners, and operators in planning and designing water and sewage works.

Reservoir Management Brochure

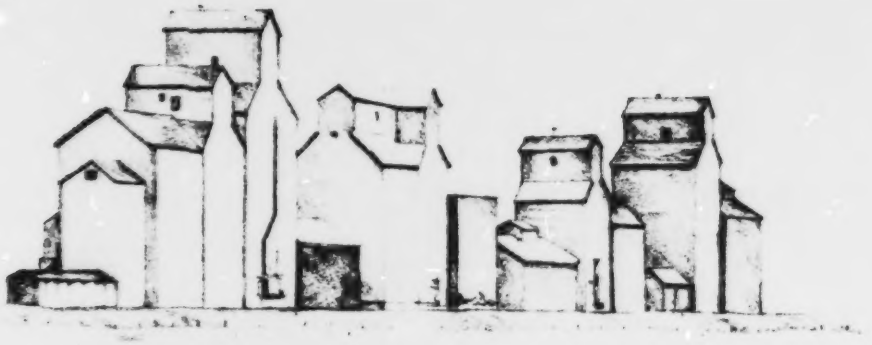
Branch staff prepared a brochure titled, "Reservoir Management, An Ounce of Prevention". This brochure outlines the physical improvements which can be made to enhance the reservoir water quality and explains the procedures involved for chemical treatment of algae and waterweeds.

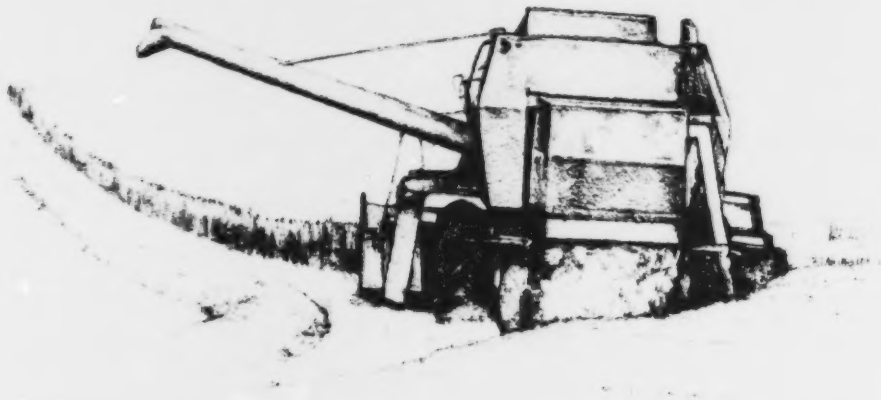
Bacteriological Monitoring in Drinking Water

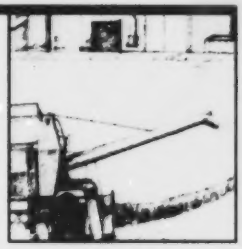
Interim procedures for following up on positive bacteriological results were prepared. A more extensive review of specific levels of bacteria counts and the appropriate actions to be taken is under way.

Land Protection Branch

D. J. Clark
Director







Objectives

— Preserve and enhance the environment by managing land use activities.
— Ensure that high quality natural, agricultural and recreational lands are not irreversibly allocated or impacted by incompatible uses.

Activities

— Safeguard the physical and living environment in the event of storage or spill of hazardous substance.
— Provide advice on risks to public safety and property in the event of a deliberate or accidental discharge of hazardous substance into the environment.
— Assess degree of contamination of lands as a result of accidental or intentional release of chemicals.
— Encourage waste reduction, recycling, reuse and recovery.
— Regulate environmentally acceptable storage, treatment and disposal of waste to land.
— Identify degradation pathways and potential impacts on the environment as a result of the use of toxic chemicals.
— Promote rehabilitation of polluted or disturbed lands.
— Management of programs to recycle auto bodies and pesticide containers.
— Identify and protect environmentally sensitive or hazardous lands.
— Recommend development of only those lands that are free from hazards such as flooding, erosion, subsidence and poor drainage.

Waste Management

Spill Response and Control

Saskatchewan Environment is responsible for the enforcement of the Environmental Spill Control Regulations which are designed to safeguard the environment in the event of a spill. The regulations require that spills of pollutants be reported immediately to the department's Spill Report Centre to ensure proper containment, clean-up and disposal of contaminated material.

Spill Report Centre personnel are available 24 hours a day. When a spill is reported, they determine if adequate measures have been taken to clean-up the spill and may also provide advice and/or instructions on further work required. The spill team is equipped to make on-site inspections, determine if appropriate actions are being taken and advise on disposal requirements.

During the year the Spill Report Centre received approximately 900 calls. Three hundred and ninety-seven of these calls were to report spills under the Environmental Spill Control Regulations. In addition, the Spill Response Team dealt with numerous complaints and requests for information concerning chemical handling, disposal of chemicals, transportation of dangerous goods and environmental manifests.

One-third of the reported spills required visits to the site to investigate, inspect and supervise remedial measures. Dozens of additional inspections were completed with the assistance of other provincial or municipal officials and emergency response organizations.

Table 4 summarizes the number of spills reported, the product, and the total volume spilled. A significant increase in the number of petroleum spills reported (increase of 146) is attributed to the greater awareness by the public to the possible dangers of PCBs in mineral oil. This resulted in a greater number of mineral oil spills being reported to the Spill Report Centre.

Table 5 illustrates the cause of the spills correlated with number of occurrences and volumes of product spilled.

Table 4

Spill Statistics by Product, Number of Incidents and Quantity

Product Spilled	Number of Incidents	Volume m3
Petroleum Products		
Gasoline	51	218.8
Diesel/Heating Fuel	27	123.2
Asphalt/Cruel	19	258.7
Used Oil	1	1.0
Others (mineral oil, unknown)	169	18.5
Subtotal	267	620.2
Non Petroleum Products		
Agricultural Chemical Fertilizers	25	19.9
Acids/Bases	9	11.8
Radioactive Materials/Contaminated Water	7	136.8
Organic/Inorganic	21	1165.9
Wastes/Sewage	13	47688.8
PCB Contaminated Materials	55	109.6
Subtotal	130	49132.8
Total	397	49753

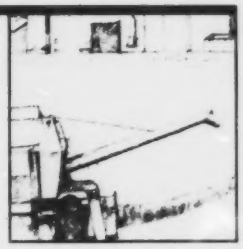
Table 5

Spill Statistics by Cause, Number of Incidents and Quantity

Cause of Spill	Number of Incidents	Volume m3
Transportation — truck, railway, etc.	64	271.2
Handling	39	72.8
Equipment Failure	203	47584.5
Below Ground Tank Leaks, Line Leaks	36	153.5
Above Ground Tank Leaks, Overflows	29	129.1
Miscellaneous — lightning, vandalism, unknown	26	541.9
Total	397	49753

During the year an extensive clean-up of waste material was completed at an old herbicide manufacturing plant, formerly owned by IPCO, near Saskatoon. Disposal of various pollutants during the 1960s in an open disposal pit created a potential for contamination of ground water in the area. Excavation and management of the soils on the surface is ensuring proper degradation of the chemical plant residues. An ongoing monitoring and sampling program is in place to ensure adequate degradation of the wastes.

A spill of an estimated 40000 L of waste heating oil was discovered in October near Uranium City. Difficulty in determining the responsible party and a need for quick response resulted in the department undertaking the initial recovery and clean-up of oil entering Bushell Bay on Lake Athabasca. Further investigations succeeded in the identification of the owner who undertook final site clean-up.



Landfills And Liquid Waste Haulers

Thirty-five applications for the construction and operation of new landfills were received and processed during the year. Inspections to evaluate site management were conducted at fifty-four existing landfills. A number of complaints relating to the operations and maintenance of landfills and illegal discharges by liquid waste haulers were also investigated. The department finalized its new Municipal Refuse Management Regulations and expects to have them in place in 1986.

Industrial and Hazardous Waste

The unit continued to assist the public, industry and other agencies with all aspects of waste management including the handling, transportation, storage, treatment and disposal of wastes. Staff visited the sites of 17 industries to discuss waste management matters and to assist them with their waste disposal problems. Several proposals from industries were received for the establishment or expansion of waste management facilities. These included the construction of a containment facility for coal ash, the expansion of a PCB treatment facility and the establishment of a PCB storage facility.

The section expanded its efforts on the matter of waste recycling and was instrumental in the recycling of a variety of industrial wastes. Waste oils which amounted to several tens of thousands of gallons continued to be the major material being recycled in Saskatchewan.

Transportation of Dangerous Goods

The Transportation of Dangerous Goods Act (TDGA) and Regulations were formally adopted by the Province. The purpose of this legislation is the promotion of public safety in the transportation of dangerous goods. Under TDGA all specified shipments of dangerous goods or hazardous wastes scheduled for disposal must be accompanied by a manifest. A waste manifesting system as cited in TDGA is being implemented by the department to manage the movement of these wastes. Each completed manifest form provides detailed information on the types and amounts of hazardous wastes being shipped, a record of the various firms involved in the shipment and information on the treatment, storage or disposal of hazardous wastes. The department, as part of its waste management mandate, oversees and monitors this aspect of TDGA. Any industry or firms involved in the shipment of hazardous wastes is assigned a provincial registration number and provided manifest forms by the department. Since the inception of this program late in 1985, the department has registered a total of 23 organizations.

A review of the potential for use of a waste injection well system as a waste disposal technology was undertaken by the Unit in 1985. The information provided from the study will better assist the department in assessing and regulating the deep well disposal of hazardous waste materials in the province.

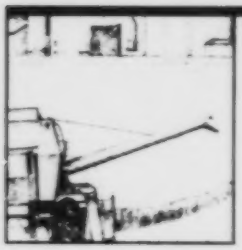
Pesticide Container Disposal Program

There are approximately one million pesticide containers sold annually in the province. Surveys conducted by the Saskatchewan Safety Council in 1981 and 1982 showed that a large number of these containers were not disposed of appropriately.

In response to numerous requests from concerned groups, the Pesticide Container Disposal Program was initiated in 1983. Approximately 70 per cent of rural municipalities took advantage of the program the first year with the establishment of 170 sites. In a number of cases, urban and rural municipalities joined forces to provide appropriate and accessible sites.

In its initial year of operation over 250,000 containers were collected and 60 barrels of residue were recovered for proper disposal. The second year of the program saw the number of sites increased to 220 with a doubling of containers crushed. Ninety-six barrels of residue were collected during the crushing operation.

During 1985-86 the number of containers crushed increased to over 600,000 with 96 barrels of residue again collected.



Operation Recycle

The responsibility for Saskatchewan's scrap vehicle recovery program was transferred to Saskatchewan Environment from the Department of Supply and Services on April 1, 1984. The purpose of the Operation Recycle Program is to encourage the effective use of recyclable components of scrap vehicles and to relieve a disposal problem created in rural and urban municipalities.

A system of 180 collection sites has been established throughout the province where vehicles gathered under the program are deposited. These vehicles are then transported to Regina where they are processed at the IPSCO steel mill. Between 13,000 and 15,000 vehicles are processed during each fiscal year.

Litter Control Act

Complaints under the province's Litter Control Act are also handled by the Land Protection Branch. Approximately 30 complaints were received and acted upon ranging from failure to comply with bottle refund regulations to depositing of refuse on Crown land.

Chemical Management

This section continued to provide technical information and assistance to the public, industry and other government departments pertaining to the proper storage and handling of toxic or hazardous chemicals and the development of emergency response contingency plans. Regulations to control the storage of hazardous substances were being developed under The Environmental Management and Protection Act. Other activities of this section are summarized as follows:

Polychlorinated Biphenyls (PCBs) Investigation Program

In response to numerous inquiries received by the department concerning the potential for PCB contamination, the department initiated the PCBs Investigation Program in May, 1985. Publicity surrounding transportation related incidents involving PCBs within Canada during the spring of 1985 prompted more than 130 inquiries.

Over the 6 month period of the program, branch staff conducted a total of 102 investigations. All inquiries were resolved to the satisfaction of both the public and the department.

Pesticide Residue Treatment Methodology Review

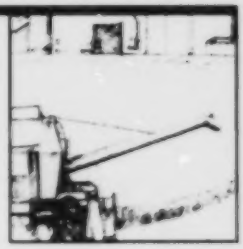
In order to identify an environmentally acceptable and cost-effective means the methodologies for the treatment and disposal of pesticide residues collected through the Pesticide Container Disposal Program were reviewed by branch staff. The review identified three possible alternatives to the presently employed method, consignment to a special waste disposal company. Two alternatives, land application and reverse osmosis treatment, will be investigated in 1986.

Pesticide Container Collection Site Monitoring Program

After three years of operation, the need for monitoring at collection sites of the Pesticide Container Disposal Program (PCDP) has become increasingly important. In order to ensure the continuing integrity of PCDP sites across the province, work began this year to design a site investigation program to be implemented in 1986 and 1987.

Field Investigative Procedure Review

During the 1985-86 fiscal year, this section prepared and revised guidelines documenting a number of technical investigative procedures in the Land Protection Branch. Topics covered in the review included: field and laboratory procedures for legal purposes, PCB sampling procedures, and procedural and technical requirements for spill related water quality investigations. These and future treatises will form the basis for a more comprehensive branch procedure manual.



Land Management

Reservoir Development Areas

A Reservoir Development Area is an area of land surrounding a reservoir and designated as such to ensure orderly development of land use around it and to accommodate the various uses of a reservoir such as power generation, recreation, public uses, cottages and institutional camps. A Reservoir Development Area is intended to ensure that land uses at designated reservoirs are well planned, provincial interests are identified and protected and high environmental standards are maintained in sensitive shoreland resource areas.

Work was completed on redrafting of the Reservoir Development Area Regulations during the year and new Reservoir Development Area Regulations under The Environmental Management and Protection Act were approved by Order-in-Council in September, 1985.

To date, seven designated provincial reservoir development areas, containing 5,700 square kilometres have been established. These are Lake Diefenbaker, Blackstrap, Brightwater, Bradwell, Zelma, Dellwood and Avonlea Reservoirs. Several other reservoirs within the province are under consideration for inclusion within this program.

During the year the branch issued three development permits at Lake Diefenbaker, all for agricultural purposes. One development permit was also issued for an agricultural purpose at Blackstrap Reservoir.

Section staff provided technical and professional advice to numerous people throughout the province considering development adjacent to waterbodies.

Contacts with cottage owners associations and municipalities to implement and update building standards and zoning bylaws for cottage areas within reservoir development areas were undertaken during the fiscal year.

Development Proposals

The staff reviews those development proposals having environmental implications, particularly around waterbodies or other environmentally sensitive areas. The purpose of this review is to ensure that the proposals are not subject to various natural hazards, will not significantly impact on the surroundings and to ensure that all aspects of good planning practice are considered.

During the fiscal year 40 shoreland proposals, 26 rural residential proposals, 48 commercial industrial proposals, 41 proposals for municipal purposes, 26 residential proposals and 18 other proposals for various purposes were reviewed by staff. These 200 proposals provided for the creation of 4581 separate parcels for various purposes.

These proposals were referred to the branch by Saskatchewan Urban Affairs and Saskatchewan Rural Development. After reviewing their environmental suitability and possible impact on other nearby uses, the branch provided comments and guidelines to the referring departments.

Studies

Work was begun, in co-operation with the Waste Management Section, to develop a management plan for the Thunder Creek Mercury Disposal Site in Moose Jaw. It is expected that this work will be continued in the 1986-87 fiscal year.

No other studies were undertaken by the Section during the fiscal year.

Investigations

Investigations carried out on reported shoreland problems included the dumping of debris into lake beds and rivers overcrowding in shoreland areas, boating conflicts, public access along the waters edge and assessing physical hazards at specific sites.

Mines Pollution Control Branch

R. R. Sentis
Director

Objectives

— Ensure short and long-term protection of the environment at mining and milling operations.
— Protect the public from naturally occurring radiation hazards.

Activities

— Licensing; to issue approvals to "operate" or "ministerial approvals" to mining companies.
— Inspections and monitoring; to routinely inspect mining operations and collect samples to determine compliance with license conditions and provincial regulations.
— Data handling; to review and analyse all environmental data related to the mining industry.
— Regulation development; to develop and update provincial regulations related to the mining industry.
— Radiation surveys; to conduct surveys to monitor areas where the public exposure to naturally occurring radiation is a concern.

Uranium Mines Section

The section is responsible for licensing, monitoring and inspecting all uranium and gold mining operations in the province. Staff visit the sites to perform inspections and take samples in and around the operations. Approvals to construct and to operate the facilities are administered by the branch. In addition, companies are required to monitor all aspects of the environment on a regular basis and submit the data to the section. This monitoring data resulted in more than 24,000 separate water quality analyses being performed from 233 different sample locations in over 1600 sample submissions. Other monitoring requirements include fish, sediments, macrophytes, air quality, and other biological media. The public has access to all licenses issued and the monitoring data.

Uranium

Eldor Mines, Rabbit Lake/Collins Bay

The Eldor Mines site completed expansion to the B-Zone facilities in 1985. Stockpiling of ore from the Collins Bay B-Zone began in October, 1985. Commissioning of the new mill circuitry and treatment facilities began November 13, 1985. Removal of the anhydrous ammonia usage in the mill process has already shown a significant decrease in ammonia levels in the final effluent stream. Fine tuning and further modifications to the mill process, tailing filtration and deposition, and effluent treatment system will continue through to the end of 1986.

Rabbit Pit disposal of filtered mill tailings also continued in 1985. Decommissioning discussions, regarding the original Tailing Pond Area, progressed with a joint review group comprised of members from various regulatory agencies.

A consultant, contracted by the branch, undertook an in-depth review of the Rabbit Lake operation's effects on the surrounding environment of Wollaston Lake. The November 1985 report concluded that this operation,".....has had no significant nor discernable effect on the aquatic ecology, fishery or any other use of the waters of Hidden Bay or Wollaston Lake".

Eldor Mines current Permit to Operate Industrial Effluent or Sewage Works No. 126-205R5, was authorized on February 11, 1986 replacing Permit No. 7-205R4.

During 1985-86 the Branch conducted 16 inspections, sampled 9 different water quality stations and had analysed 1425 separate parameters from 38 samples. A specific project study on the original mill ore storage area was initiated by the branch in early 1986.

Key Lake Mining Corporation, Key Lake

The Key Lake Mining Corporation's mining and milling facilities at Key Lake completed its second year of operation on October 20, 1985.

No major modifications or changes were made to the companies mining or milling operation during the licence year.

The company is presently developing a proposed reclamation and decommissioning plan for close-out of the Gaertner pit. Present scheduling indicates ore from the Gaertner pit will be mined out by late 1986.

Construction activities for the development of the Deilmann ore body included the continued removal of overburden and the installation of 54 groundwater dewatering wells. At present there are a total of 71 groundwater dewatering wells in operation. Present scheduling indicates mining of Deilmann ore body will commence early in 1988.

Permit to Operate Industrial Effluent or Sewage Works No. 55 was issued May 24, 1985 and became effective May 31, 1985.

The Branch conducted 15 inspections during which 3 water quality stations had 918 analyses from 25 different samples. A specific project study on the mill effluent compositing procedure was initiated in early 1986.

Amok, Cluff Lake

The present Phase II operations began in August of 1984. During 1985-86 Amok completed the mining of the O-P underground workings. The completion of the O-P workings initiated the mining of the DP underground zone. Mining of the Claude open pit ore body progressed throughout the year.

Research and discussions with the mining company and the regulatory agencies concerning the disposal of leach tailings continued in 1985. The culmination of the research and discussions was a submission from the Company requesting approval to reprocess the Phase I leach tails for gold and uranium recovery.

During the 1985-86 license year there was a total of 15 inspection trips to the Amok site. During the visits there were three water quality stations monitored with 16 separate samples taken and 567 parameters analyzed.

In early 1985, a project study was initiated to determine the long-term structural stability of the Amok tailing dam.

In January, 1986, a project study on the status of the mined out D pit was initiated with joint funding from the company.

Eldorado Resources Limited, Beaverlodge

Eldorado Resources Limited's Beaverlodge operation located near Uranium City completed all phases of decommissioning of the mine site. The company is presently negotiating a surface lease to accommodate the transition phase monitoring schedule which will determine the success of the completed reclamation and decommissioning activities.

Branch staff inspected the site 7 times during 1985-86, collecting 34 samples between 8 monitoring stations for a total of 1224 parameters analyzed.

National Uranium Tailings Program

The National Uranium Tailings Program of the federal Department of Energy, Mines and Resources was initiated in 1983. The five year intensive research program into the long-term management of uranium tailings consists of three components: disposal technology, modelling and measurement.

The objective of the program is to provide a scientifically credible information base that will assist the government regulatory agencies in making decisions with a degree of confidence, and in establishing criteria for the long-term protection of man and his environment.

Saskatchewan Environment provides representatives to the Senior Advisory Review Board and the Technical Advisory Committee to provide technical advice and assistance to the Department of Energy, Mines and Resources on research projects from start to finish.

The National Uranium Tailings Program is conducting tailing research at Gunnar, Key Lake and Eldor Mines.

Gold

Saskatchewan Mining Development Corporation Star Lake Project

SMDC is presently in the construction phase for their planned 220 ton/day gold mine/mill complex near Star Lake. A Ministerial Approval, MA 38 was issued October 31, 1985 to SMDC for Phase I Mine Development. This involved constructing a decline from surface to intersect the Zone 21 ore body at 2 levels (60 ft. and 160 ft.) with sufficient development at each level to confirm anticipated grades and tonnages. By March 31, 1986, this phase was completed, with 5000 tons of ore removed and the decision was made to fully develop the mine/mill complex.

Following issuance of a Ministerial Approval for the project under The Environmental Assessment Act on April 2, 1986, further construction and operating approvals will be considered by the Branch during 1986. SMDC plans to commence mill production by January, 1987.

The Ministerial Approval (MA 38) required SMDC to carry out a water quality monitoring program. Except for a single sample in November, the program was not initiated until January, 1986, which coincided with commencement of discharge to the environment.

Five environmental inspections by the Branch were conducted during the year. Nine samples were taken during the year, both for baseline data collection and to compare with Company monitoring. There were 405 parameters analyzed from 5 water quality monitoring stations.

Flin Flon Mines Ltd., Rio Mine

Flin Flon Mines and its assets were in receivership during the entire year, with no activity on-site.

Two inspections were performed during the year. Four water quality stations were sampled and 223 parameters in total analyzed.

As of March 31, 1986, a regular inspection program is scheduled through 1986.

Unless the mine status changes, decommissioning will be required during 1986.

Mahogany Minerals Resources Incorporated Mallard Lake and Rod Zone

Exploration of claims in this area continued during the year. Mahogany also obtained approval to dewater the Decade Mine, for evaluation purposes, but dewatering was not carried out, and the Ministerial Approval (MA 37) expired.

An active year for advanced exploration is anticipated in 1986, and several environmental inspections are planned. During 1985-86 two inspections were carried out with 3 water quality samples taken for 120 parameters.

Spill Response

Three agencies, the Atomic Energy Control Board, the federal Ministry of Transport, and Saskatchewan Environment are involved with the transportation of hazardous substances. The Mines Pollution Control Branch assists with inspections and remedial actions for spills of materials to, from, and at the mining operations.

Technical Services Section

In early 1986, the Technical Services Section was established to ensure that all specialized technical needs of the Branch are provided for. Specialized expertise is provided in a wide range of disciplines including: radiation; hydrogeology; water quality and aquatic biology; chemistry; contaminant pathway analysis; and environmental engineering.

The section reviews detailed Environmental Impact Assessments; technical documents of mining companies and their consultants; and other technical papers from provincial or federal agencies. Special studies are conducted to address special problem areas. The consultative advice provides assistance to the Branch's programmes of licensing and monitoring mining operations in the province.

Radiation

Uranium and other radionuclides are naturally present in most soils throughout the world. Natural background levels of radiation from these elements have been shown to cause potential health effects in some locations. In order to assess this potential problem, the division conducted province-wide surveys in communities where the levels could be significant. The report on the surveys was published in early 1985, concluding that no homes surveyed would require "prompt interim remedial action", as specified by the Atomic Energy Control Board. The study found that the emergence of airtight "energy efficient" housing designed for reduced ventilation, may increase the risk from natural radiation.

Potash/Coal Section

The section administers the Mineral Industry Pollution Regulations as they apply to the potash and coal mines in the province. Compliance with these regulations is ensured through the issuing of Ministerial Approvals for each operation, the submission and review of environmental monitoring reports and by site inspection. These functions were performed by the section for each of the ten potash operations and the five coal mines.

The section has similar responsibilities and performs the same services for sundry other mining operations in the province which, during the year, included a base metal mine, a solution salt mine, a peat mine, a gold placer prospect and a potassium sulphate development.

A total of twenty Ministerial Approvals were issued by the section to mining operators during the year. In addition to the above, inspections were also made by the section to the now defunct gold mine at Creighton, two of the gold exploratory properties on the La Ronge Belt, a silica sand prospect near Hudson Bay and one sodium sulphate operation.

Potash Mining

Saskatchewan's ten potash mines are licensed under the regulations to store the waste salt and brine generated by the mining and refining activity in approved tailings management areas. Excess volumes of brine may be injected into briny aquifers in very deep strata but no other releases are permitted.

All the mines, in compliance with conditions in their licenses, continued to monitor the effectiveness of their brine containment systems. Past experience has demonstrated some degree of inadequacy in the original containment designs and most mines have now completed or are constructing auxiliary systems to ensure containment.

Brine Inflows In Potash Mines

The presence of water bearing strata immediately above the potash mine workings has always posed a potential threat to the industry. Once the mines were fully developed very little water was encountered in the mining operations, however, and at the end of 1983 the largest inflow being experienced at any mine amounted to between 1 and 2 litres per second and this was quite exceptional.

At the end of 1984 PCS Rocanville experienced an inflow of 150 litres per second endangering the whole mine. A massive effort on behalf of the corporation brought this under control in a few months.

During the year under review three other mines have encountered major inflows of brine: Cominco - 10 litres/second, PCA - 50 litres/second and IMC at their K-2 mine - 280 litres/second. Little progress towards controlling these inflows has been made so far and these volumes of brine are being pumped to surface.

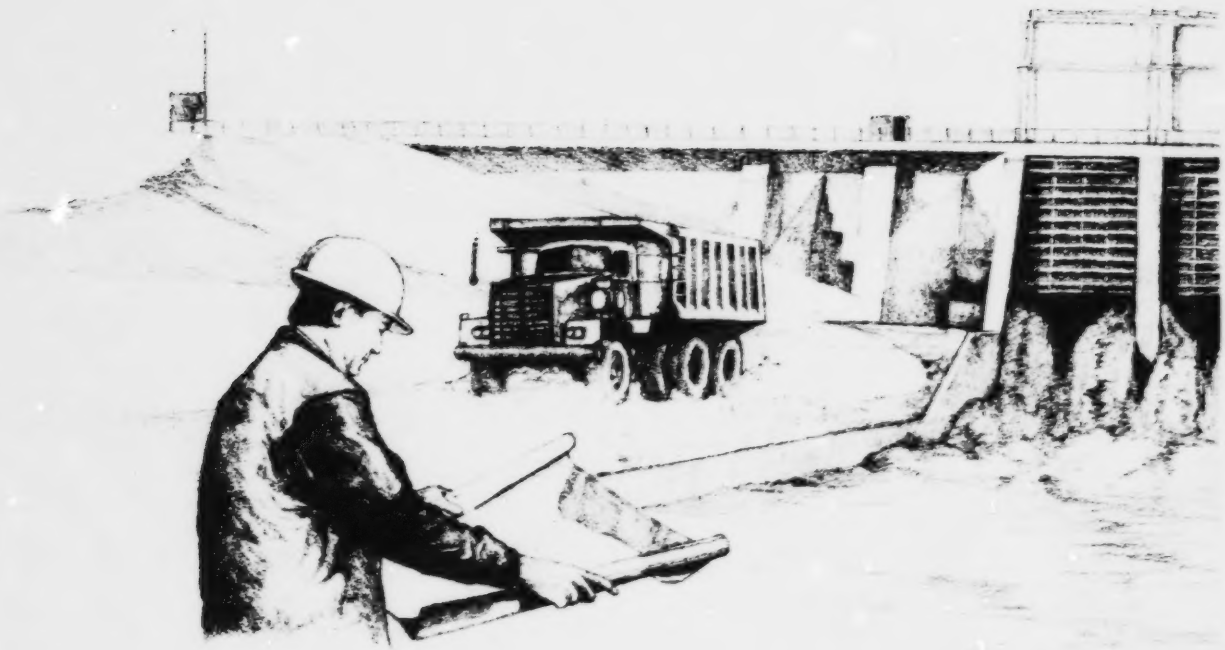
The sections immediate interest is that the amount of waste liquid to be disposed of is increasing. At this time, it appears that increased injection to the deep strata can and will be able to handle this.

Coal Mining

All five operating coal mines were licenced under the regulations and the quantity and quality of discharges of water were monitored. No particular problems were experienced during the year.

Co-ordination and Assessment Branch

R. E. Walker
Director



Objectives

- To have prospective developers fully informed about Saskatchewan's environmental protection policies and regulatory requirements.
- To have all plans for future development activities in or near Saskatchewan fully evaluated as to the acceptability of their likely environmental implications **before** commitments to proceed with those plans are made.
- To have in Saskatchewan a system of reserves which exemplify and protect both unique and typical aspects of the province's natural heritage.

Activities

- Apprise prospective developers of provincial environmental requirements applicable to their development proposals, particularly those requirements under legislation administered by Saskatchewan Environment.
- Administer Saskatchewan's environmental assessment process in accordance with requirements and provisions of the province's Environmental Assessment Act and in so doing:
  - review preliminary development concepts to help prospective developers identify potential and socio-economic problems therewith and define the scope of any assessments which might be necessary to satisfactorily address those problems and produce environmentally sound development plans;
  - review each Environmental Impact Statement (EIS) submitted to the department by a developer seeking ministerial approval under The Environmental Assessment Act, to ensure that the document provides a technically sound basis for both public evaluation of the proposed development's likely environmental implications and the minister's subsequent decision regarding its approval;
  - facilitate public examination of and comment on each EIS in accordance with the requirements and provisions of The Environmental Assessment Act;
  - recommend to the Minister conditions which he might attach to his approval of each new development to increase the likelihood of its proceeding in an environmentally acceptable manner; and
  - monitor the implementation of plans approved under The Environmental Assessment Act to ensure developers' compliance with the terms and conditions of their approvals, and recommend appropriate action in any case where a developer fails to comply with those terms or conditions.
- Administer Saskatchewan's Ecological Reserves Act, and in co-operation with the Land Protection Branch:
  - identify areas of the province worthy of reserve status;
  - arrange for official designation of those areas; and
  - establish conditions under which the reserves are to be managed and protected.
- Represent the department on interagency and interjurisdictional committees and study teams attending to multidisciplinary environmental matters of importance to Saskatchewan.

Environmental Assessment

In 1985-86 proposals for 48 new development projects were submitted to the Co-ordination and Assessment Branch for formal review through the environmental assessment process. In addition, reviews of 21 proposals from the previous year continued into 1985-86.

The status of the various proposals received or under review during the fiscal year was as follows:

Table 6

Projects Requiring an Impact Assessment or Undergoing Screening at Year End.

PROPONENT	PROJECT
Cigar Lake Mining Corporation	Waterbury Lake Uranium Development
City of Regina	Waste Management Study
Erskine Resources Ltd.	Shale Oil Recovery, Pasqua Hills
Federation of Saskatchewan Indian Nations	All Season Road Highway 102 to Grandmother Bay
Mahogany Mineral Resources Inc.	Mallard Lake Gold Development
McNeill Northern Services Ltd.	Cluff Lake to Fond-du-Lac Haul Road
Northern Landfill Inc.	Commercial Landfill
Prairie Coal Ltd.	Willow Bunch Mine Expansion
Redberry Development Corp.	Recreational Subdivision, Redberry Lake
R. M. Hoodoo	Wakaw Lake Weir
Sask. Highways and Transportation	Highway 47 Reconstruction, Phase One
Sask. Power Corporation	Alberta-Saskatchewan 230 KV Interconnection
Sask. Power Corporation	Boundary Dam Supplemental Water Supply
Sask. Power Corporation	Shand/Rafferty/Alameda Power and Water Management Development
Sask. Power Corporation	Uranium City to Collins Bay 115 KV Transmission Line
Simplot Chemical Company Ltd.	Fertilizer Facility

Table 7

Projects Screened — Impact Assessment Not Required

PROPONENT	PROJECT
Cannich Holdings	Oil Reclamation Plant, Estevan Area
C.N. Explorations	Gas Plant, Kerrobert Area
Cominco Engineering Services Ltd.	Ammonia Storage and Handling Ltd. Facility Vanscoy Area
Coseka Resources Ltd.	Gas Development, Great Sand Hills Area
D. M. Wolcott and Associates	Nottingham Gas Project
Ducks Unlimited Canada	Coldwell Creek Wetland Development Project
Ducks Unlimited Canada	Foam Lake Heritage Marsh Wetland Development Project
Ducks Unlimited Canada	Gamble Wetland Development Project
Ducks Unlimited Canada	Gomersall Wetland Development Project
Ducks Unlimited Canada	Horsehide Lake Complex Wetland Development Project

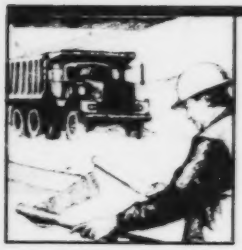


Table 7

Projects Screened — Impact Assessment Not Required (cont.)

Ducks Unlimited Canada	James Wetland Development Project
Ducks Unlimited Canada	Kitako Wetland Development Project
Ducks Unlimited Canada	Knudson Marsh Wetland Development Project
Ducks Unlimited Canada	Last Mountain Lake Wetland Development Project
Ducks Unlimited Canada	Long Lake Wetland Development Project
Ducks Unlimited Canada	Makaroff-Baulanoff Complex Wetland Development Project
Ducks Unlimited Canada	Nabe Wetland Development Project
Ducks Unlimited Canada	Quaroni Wetland Development Project
Ducks Unlimited Canada	Roufosse Marsh Wetland Development Project
Ducks Unlimited Canada	Tesch's Marsh Wetland Development Project
Ducks Unlimited Canada	Wallace Wetland Development Project
Ducks Unlimited Canada	West Stinking Lake Wetland Development Project
Husky Oil Operations Ltd.	Water Intake Structure and Pipeline, North Sask. River
Interprovincial Pipe Line Ltd.	Pipeline Facilities Expansion Program
Merland Explorations Ltd.	Great Sand Hills Area Gas Development, 1985
Oakwood Petroleum Ltd.	Gas Well Development, Great Sand Hill Area
Ocelot Industries Ltd.	Pipeline System, Liebenthal Area
PetroCanada Ltd.	Oil Drilling, Leier Lake
P. A. Silica Sand Company	Silica Sand Quarrying Operation, La Ronge Area
Red Deer Silica Ltd.	Silica Sand Quarrying Operation, Hudson Bay Area
SaskOil	Senlac Fireflood Heavy Oil EOR Project
Sask. Power Corporation	Coleville to Ermine, 138 KV Transmission Line
Sask. Power Corporation	Freemont Tap — 138 KV Transmission Line
Sask. Power Corporation	Rural Gasification Program, 1985
Sask. Power Corporation	Swift Current-Bone Creek-Maple Creek Circuit Separation
Sask. Research Council	Processing of High Grade Ore in Multi-purpose Pilot Plant
Sourcex Seismic Ltd.	Seismic Program, Great Sand Hills Area
Steel Brothers Ltd.	Bulk Lime Terminal, Vanscoy
Suramco Chemical and Research Ltd.	Oil Reclaiming Facility, Research Ltd. Marsden Area
Universal Explorations Ltd.	Seismic Exploration, Grasslands Park Area

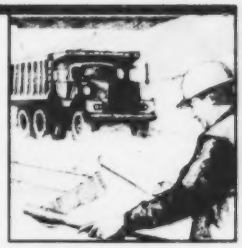


Table 8

Assessment Process Completed

PROPONENT	PROJECT
Husky Oil Ltd.	Aberfeldy Commercial EOR Project
Husky Oil Ltd.	BiProvincial Heavy Oil Upgrader
NewGrade Energy Inc.	Heavy Oil Upgrader, Consumers Co-op, Regina
Potash Corporation of Sask.	Potassium Sulphate Plant, Big Quill Lake
Sask. Mining Development Corp.	Star Lake Access Road
Sask. Mining Development Corp.	Star Lake Gold Development
Sask. Power Corporation	Coteau to Brada, 230 KV Transmission Line

Table 9

Projects Deferred or Cancelled

PROPONENT	PROJECT
Canadian Occidental	McLean Lake Uranium Petroleum Ltd. Development
Esso Minerals Canada Ltd.	Midwest Lake Uranium Mine and Mill
May and Baker Canada Inc.	Herbicide Plant, Regina
Miller, Peter	Placer Gold Mining, North Saskatchewan River
Potash Corporation of Sask.	Bredenbury Potash Mine
Sask. Mining Development Corp.	Dawn Lake Uranium Project

In addition to the 69 projects undergoing formal environmental assessment and review, the Co-ordination and Assessment Branch was involved in the review of an additional 201 project referrals. These referrals comprised of 65 subdivision applications, 46 referrals from Sask. Water Corporation, 40 proposals related to oil and gas development, 19 proposals related to seismic exploration, 13 Treaty Indian Land Claims and 18 miscellaneous referrals. A rapid increase in oil and gas activity in southern and southwestern Saskatchewan also resulted in the need to screen a total of 83 blocks/parcels of land located in sensitive rangelands and/or sand dune habitat in advance of oil and gas sales.

Committees/Studies

Cold Lake/Beaver River Study

This study was completed during the 1985-86 fiscal year. The study was initiated by Alberta Environment to evaluate water management options for the Cold Lake/Beaver River watershed from which large amounts of water were required for extraction of heavy oil west of Cold Lake, Alberta. Saskatchewan Environment co-operated with Saskatchewan Water Corporation in representing this province's interests on Alberta's study team. In October, 1985, Alberta adopted a long-term water management plan for the basin, which included piping water from the North Saskatchewan River to the heavy oil fields. This plan effectively relieved Saskatchewan of any potential environmental problems which could arise from use of Cold Lake water and a dam at the outlet of the Cold River in Saskatchewan.

MacKenzie River Basin Study

The Co-ordination and Assessment Branch represented Saskatchewan Environment on the MacKenzie River Basin Environmental Subcommittee. The task of this Saskatchewan-

Alberta committee, which included a representative of the Saskatchewan Water Corporation, was to address environmental issues which should be considered in establishing a Saskatchewan/Alberta water management agreement for the MacKenzie River watershed . A work plan outlining information which will be required prior to preparation of such an agreement was prepared in 1985-86.

Heavy Oil Studies

Saskatchewan Environment maintained its ongoing interest in the environmental aspects of enhanced heavy oil recovery in the Lloydminster area. The department, Saskatchewan Energy and Mines, other agencies, public groups and industry continued their involvement in the heavy oil project through which the unique environmental issues associated with heavy oil production are addressed co-operatively. The department maintained an active role in incorporating results of earlier studies into policy and guideline documents issued by Saskatchewan Energy and Mines. In addition, the department was involved extensively in review of Husky Oil's environmental impact assessment studies for their upgrader and commercial-scale Aberfeldy enhanced-recovery projects, both of which received Ministerial Approval during this year.

Reclamation

The branch continued liaison with the Saskatchewan Power Corporation and the coal mining companies to ensure that reclamation guidelines are being followed. Reclamation at Coronach and Estevan is proceeding according to schedule.

Wetlands Technical Advisory Committee

The Co-ordination and Assessment Branch represented Saskatchewan Environment on the Wetlands Technical Advisory Committee. The purpose of this committee is to review proposals for water development projects which might affect waterways, lakes and wetlands, to resolve any conflicts which may arise among wildlife, fisheries and agricultural interests and to encourage development of works which are in the best interests of the Province of Saskatchewan. The committee also includes representatives from the departments of Agriculture, Parks and Renewable Resources and Saskatchewan Water Corporation. Twenty projects were cleared by the Wetlands Technical Advisory Committee during the 1985-86 fiscal year.

Environmental Guidelines

The branch continued to distribute environmental protection guidelines pertaining to roads, transmission lines, gravel pits, mineral exploration and heavy oil pilot projects. Guidelines for conducting seismic projects on sensitive terrain Crown lands in southwestern Saskatchewan were completed and circulated. Guidelines outlining environmental protection regulations and procedures for the oil and gas industry were also prepared and distributed to assist that industry in its rapid expansion in the province.

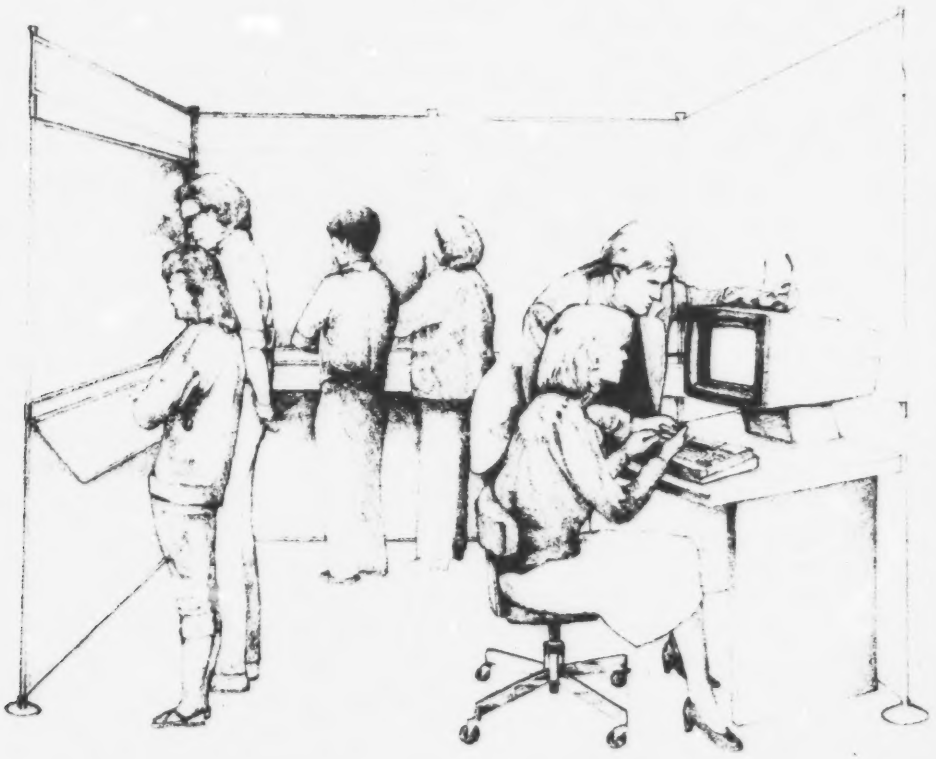
Protection of Environmentally Sensitive Lands

On an ongoing basis staff of the Co-ordination and Assessment Branch endeavour to identify environmentally sensitive areas, assess their vulnerability to different types of development activity and establish mitigation guidelines for prospective developers to follow in those parts of the province where levels of such activities are expected to increase significantly in the near future.

In 1985-86 the oil and gas industry rapidly expanded exploration and development activities in the often fragile native rangelands and sand hills areas of southern and southwestern Saskatchewan. The branch commissioned a study to aid in identification of the most acutely sensitive areas, to recommend operating procedures which would minimize environmental damage in those areas, and to recommend appropriate reclamation procedures. Preparation of guidelines based on this study was initiated. When completed these guidelines will be distributed to prospective developers as part of the environmental review process. Co-operative arrangements were established with Saskatchewan Agriculture and Saskatchewan Energy and Mines to facilitate environmental review of all development activities proposed for the most sensitive lands.

Information and Communications Branch

C. M. Olynik
Director



Objectives

— To have the department continually apprised of people's concerns about Saskatchewan's environment and about any shortcomings they perceive in the province's efforts to protect and enhance that environment.
— To increase the Saskatchewan public's early awareness of the policies and programs whereby the department is attempting to address important environmental issues.
— To place before the people of Saskatchewan evidence that their government is sensitive to environmental issues and prepared to deal promptly and effectively with them.

Activities

— Monitor and evaluate public opinion with respect to current and emerging environmental issues in Saskatchewan/public opinion surveys.
— Provide a means whereby individual Saskatchewan citizens can readily exchange information with the department regarding matters of specific concern or interest to them/ inquiry telephone lines and correspondence.
— Develop and implement strategies to inform the Saskatchewan public about environmental issues and about department policies and programs which address those issues/ promotional programs and brochures.
— Arrange for the timely promotion of those department programs which require public support or co-operations/public workshops.
— Draw public attention to department actions which have prevented or successfully mitigated potentially significant environmental problems in Saskatchewan/press releases.
— Provide advice and assistance in the design and implementation of public involvement programs through which the people of Saskatchewan can contribute to the department's development and improvement of provincial environmental management and protection policies, regulations, etc./public hearings and conferences.

News Releases

Efforts were made to keep the public informed of all major events affecting Saskatchewan's environment, and the activities of the department in monitoring, protecting and enhancing it.

During the 1985-86 fiscal year, 22 news releases were prepared and distributed to the media.

Table 10

News Releases Issued 1985-86

Subject	Date
PCB Spill, Saskatoon	April 19, 1985
Plans for Movement of Transformer and Truck Released (PCB Spill, Kenora, Ontario)	April 24, 1985
Clean-up of Inland Steel Property in Saskatoon	April 26, 1985
Sask. Power Corp. PCB Spill Investigated	May 1, 1985
North Saskatchewan River Water Quality Reports Released	May 6, 1985
Untreated Sewage Released (City of Saskatoon)	May 7, 1985
Environmental Appreciation Week	May 13, 1985
Radon Surveys in Saskatchewan	May 14, 1985
Investigation Completed into PCB Contaminated Oil Burn (near Uranium City)	July 2, 1985
Algae Growth Expected This Year	July 23, 1985

Table 10

News Releases Issued 1985-86 (cont.)

Clean-up of Chemical Disposal Pit (near Saskatoon)	July 31, 1985
Saskatchewan River Dye Studies Planned	August 12, 1985
Public Review Period Announced Husky's Heavy Oil Upgrader	August 12, 1985
First Ecological Reserve Designated (Assiniboine Slopes)	August 27, 1985
Armak Chemicals Spill of Cocoa Diamine into South Saskatchewan River	September 11 1985
More Acid Rain Studies in Western and Northern Canada	September 16, 1985
Two Regional Offices Opened (Kindersley and Watrous)	November 4, 1985
Environmental Approval for Star Lake Gold	January 6, 1986
Public Review Period Announced (Husky Aberfeldy)	January 13, 1986
Seventh Regional Office Opened (Melville)	February 3, 1986
Environmental Approval Given Husky Aberfeldy Project	March 13, 1986
Emergency Measures Program Announced	March 26, 1986

Pesticide Container Disposal Program

Although this program has proven to be very successful, it was felt an advertising campaign was needed to remind farmers and other people involved with pesticides of the program.

Branch staff handled the campaign which included the development of new brochures, posters and print ads. Newspaper, television and radio ads were also a large part of the campaign. Letters, posters and brochures were included in a major mail-out to rural municipalities, cities, towns, villages, elevators and others involved in the handling of pesticides. Approximately 1300 kits were mailed out and continued to be available on request.

Spill Control

A major advertising campaign was developed to promote the department's Spill Control program.

An information package including folders, posters, brochures, wallet cards and stickers was developed. Also included in the package were spill report forms and spill control regulations. Approximately 1500 kits were mailed out to rural municipalities, cities, towns, villages, transport companies and others on request. The information package continues to be available from the department on request.

Magazine advertisements were also used to promote awareness of the Spill Report Centre.

Clean Machine

The Clean Machine anti-litter program was managed by the Information and Communications Branch. The program ran the week of May 13 - 19, 1985 during Environmental Appreciation Week in Saskatchewan.

The purpose of the program is to promote environmental awareness and to encourage people to commit themselves to protecting and preserving our environment.

Information kits which included flyers, a letter, buttons and garbage bags were distributed to individuals, groups and organizations to assist them with clean-up activities in their communities.

The Clean Machine took on special significance this year, during Heritage Year and Youth Year. Our environment is a great part of our heritage, and our future depends on the wise use and preservation of it for our youth of generations to come. Heritage and Youth Year committees received information kits.

Radio, newspaper and redi-print advertisements were used to promote the program across the province.

Operation Recycle

The branch handled development and placement of tender ads for the Operation Recycle program. Tender ads were placed in daily and weekly newspapers across the province.

Public Review and Public Notice Announcements

Newspaper advertising was used to inform the public of proposed developments and to encourage public participation in public reviews and environmental impact assessments.

Public Review and Public Notice announcements were issued on projects such as Star Lake Gold Mine and Mill, Husky Oil's heavy oil upgrader and the Prairie Coal proposed Poplar River mine expansion.

The Information and Communications Branch also set up information centres throughout the province to enable the public to view documents on proposed developments during the public review periods.

Publications

Existing information materials continued to be distributed throughout the year. New brochures on the Pesticide Container Disposal Program and the Spill Report Centre were developed. These publications are distributed on request as are the other information materials.

Display

A new display system was purchased and developed. The display was developed to represent each branch of the department and the department as a whole.

Information and Communications Branch staff manned the display on several occasions including Canadian Environment Week and an SOEEA conference in Lumsden. Other branches also made use of the display at various meetings, seminars and conferences.

Administration Branch

R. P. Knoll
Director

Objectives

— To provide centralized administrative, financial, personnel, procurement, systems and office support services to all branches;
— To advise department management on administrative issues, and develop and implement administrative policies;
— To represent the department and provide liaison with private and central government agencies for the acquisition of resources.

Activities

— Management and advisory services on administrative, financial, and personnel operations; preparation of budgets, legislation, Cabinet and Treasury Board submissions; and administrative policy development and implementation.
— Financial and procurement services for central accounting of expenditures and revenues, contract administration, and grant payment authorization; and the acquisition of CVA vehicles, supplies, equipment and services for the department.
— Personnel and office services for management of central records, forms, filing, mail and library functions; provision of office space, furniture and parking; and staff training and personnel requirements of the department.
— Systems and computer services for acquisition, management and operation of all department computer systems; provision of analyst support services; and co-ordination of central data entry and word processor services for the department.
— Executive administration to facilitate the operation of offices for the Minister, Deputy Minister, Assistant Deputy Minister, and Special Advisor to the Deputy Minister in respect to staff resources and related office requirements.

Financial and Procurement Services

This section was responsible for all accounting and purchasing operations for the department. This included processing expenditures, purchase of materials and supplies, processing of travel and sustenance claims, budgeting, inventory control, collection of revenue, contract administration, and maintenance of departmental accounting records and statements.

Revenue and expenditure transactions are now processed on a centralized automated system that was implemented at the beginning of the year.

All department equipment and supply acquisitions are made on a centralized basis by this section. Services also included central co-ordination of department CVA vehicles and telephone requirements.

Personnel and Office Services

This section provided centralized personnel, accommodation, records, mail and library services to the department.

The department personnel function was transferred to Saskatchewan Agriculture — Human Resources Branch, July 1, 1985, as part of a government consolidation action. Staff development and training was retained by the department and liaison between the department and personnel agencies became a very important function during this period.

Plans to consolidate three branches of the department into one wing in the Walter Scott Building were finalized. The wing was renovated and branches were relocated in March, 1986.

This section received and distributed all department mail, and processed all department shipments. The department's centralized records system is also maintained in this section.

The Environment Library is operated by this section. The library subscribed to periodicals and purchased books, reports and pamphlets for the department. The library also obtained inter-library loans, and co-ordinated staff requests for computer searches. A Library Technician position was created and recruited during the year.

Systems and Computer Services

This section co-ordinated all computer programs in the department and participated in systems studies to improve effectiveness and efficiency of department operations. Services included assisting

branches in the acquisition of computer equipment and providing analyst support services.

Recruitment of a Manager, Systems and Computer Services for the department was completed during the year.

An evaluation of existing computer systems was conducted, and internal department procedures for the acquisition of computer equipment and services were developed. Initial plans were made for the development and implementation of a Department Informatics Strategic Plan.

Table 11

Statement of Expenditures and Revenues for the Fiscal Year Ending March 31, 1986

Saskatchewan Environment operations are financed from the Consolidated Fund in accordance with a budget approved by the Legislature. Expenditures for the fiscal year ending March 31, 1986 were as follows:

Expenditures

Administration	$ 832,500
Information and Communications	332,896
Air Pollution Control	392,834
Water Pollution Control	1,390,859
Land Protection	1,307,014
Mines Pollution Control	591,396
Co-ordination and Assessment	489,546
Emergency Measures Organization	69,793
Payment under Operation Recycle Program	1,486,156
Grants for Environmental Purposes	30,083
Grants to the Toxicology Research Center	200,000
Grants to the Water Appeal Board	48,832
Total	$7,171,909

The Saskatchewan Emergency Measures Organization was transferred from Saskatchewan Urban Affairs to Saskatchewan Environment on February 13, 1986.

Revenues

Water Resources — Rental	$ 426,748
Cost-Sharing Programs — Canada	11,935
Miscellaneous Commodity Sales — Operation Recycle	1,117,184
Other Revenue-Foreign Exchange Expenditure Refunds, Personal Mileage	844
Total	$1,556,711

Saskatchewan Environment collects water resources revenue from the Saskatchewan Water Corporation for 50% of the rental for water use under The Water Power Act.

Revenues were also received from other governments for services rendered under cost-sharing programs and from the Operation Recycle Program for sales to IPSCO Inc. of scrap vehicles collected throughout the province.